

19.{TWICE AMENDED} An optical element for aiming and visually indicating a reading area of a coded information reader, comprising means for splitting light beam into at least two beam portions adapted to be projected on at least two different zones of a reading area along at least two different optical paths, wherein the optical element is a refractive optical element.

20.{TWICE AMENDED} An optical apparatus for reading information in a reading area, the optical apparatus comprising an aiming device, the aiming device having:

an emitter which emits a light beam;

an optical element which splits the light beam into at least two different beam portions active on at least two different zones of a reading area of the optical apparatus along at least two different optical paths, wherein the optical element consists of a refractive optical element.

REMARKS

Favorable consideration of the captioned application is respectfully requested.

A. SUMMARY OF THIS AMENDMENT

By the current amendment, Applicants:

1. Advise of the simultaneous submission of a substitute specification which implements various editorial amendments to the specification as depicted on the Appendix submitted with the substitute specification.
2. Amend claims 1, 4 - 20, essentially for conformity to US practice (see section C below).
3. Thank the Examiner for the indication of allowable subject matter in claims 6 and 13, and write both claims 6 and 13 as independent claims including the subject matter of independent claim 1 and some (but not all) of the subject matter of dependent claim 4.
4. Add new claims 21 - 32 (see section C below).
5. Provide a new Abstract.
6. Advise the Examiner of the simultaneous filing of Proposed Drawing Changes (see Section D below).

7. Respectfully traverse all prior art rejections (see Section E below).

B. THE AMENDMENTS TO THE SPECIFICATION

The amendments to the specification implemented by the Substitute Specification are depicted on the Appendix submitted with the substitute specification.

C. THE AMENDMENTS TO THE CLAIMS AND THE NEW CLAIMS

The amendments to original claims are depicted in underline and bracket format in the attached Appendix.

New independent claim 21 resembles amended independent claim 1, but is not in means plus function form. New dependent claims 22 - 32 also correspond to amended existing dependent claims..

D. THE PROPOSED DRAWING CHANGES

The Proposed Drawing Changes provide replacement drawings for Figs. 2 - 6, the shading of the original Figs. 2 - 6 not being optimal. All features of the elements of replacement Figs. 2 - 6 are fully supported textually by the specification. In this regard, for Fig. 2 see page 15, lines 19 - 35; for Fig. 3 see page 16, lines 35 - page 17, line 7; for Fig. 4 see page 16, lines 7 - 17; and for Figs. 5 and 6 see page 17, line 16 through page 18, line 5.

In addition, new Fig. 12 is supplied for the embodiment explicitly described on page 15, line 36 through page 16, line 6.

The foregoing citations are merely exemplary references to the supporting disclosure.

E. PATENTABILITY OF THE CLAIMS

Claims 1, 4-5, 7-9, 11, 16 and 19-20 stand rejected under 35 USC §102(b) as being anticipated by U.S. Patent 5,627,360 to Rudeen (see enumerated paragraph 10 of the Office Action). Claim 10 stands rejected under 35 USC §103(a) as being unpatentable over U.S. Patent 5,627,360 to Rudeen in view of U.S. Patent 5,296,689 to Reddersen et al (see enumerated paragraph 12 of the Office Action). Claims 2-3, 12, 14-15 and 17-18 stand rejected under 35 USC §103(a) as being unpatentable over U.S. Patent 5,627,360 to Rudeen in view of EP 0 0997 760 A1 to Canini (see enumerated paragraph 13 of the Office Action). All prior art rejections are respectfully traversed, since none of the applied prior art documents disclose or suggest an aiming device including an optical element as above defined.

Rudeen, which the Examiner considered to be the relevant prior art for independent claims 1, 19 and 20, discloses a hand-held scanning bar code reader including an optical element which causes emission of a visible spotter beam to provide visible indications of the area of the surface being scanned. A dithering mirror is provided to sweep the light beam on a scanning plane to produce a scanning line over a target object. In a first embodiment thereof, the light beam to be scanned is a human-visible light beam produced by a laser diode and a visible light beam produced by a LED (col. 5, lines 36 to 45). The optical element includes first and second end portions with a central portion therebetween. The optical element intercepts the visible light and redirects the visible light depending upon which portion of the optical element the scanning beam strikes. The central portion is essentially flat and transmits the scanning beam without substantial refraction or focusing, thus producing the scanning line over the target object. The first and second end portions have a diffractive, segmented, sawtooth surface which is tilted slightly with respect to the central portion and which redirect the light beam to create a pair of cursor beams which forms a pair of visible light spots on the target object, on opposite side of the scanning line (alternatively, the first and second

portions may be formed from gradient surfaces or from holographic or gradient index regions) (col. 7, lines 5 to 52).

From the above, it is clear that the optical element of Rudeen is structurally and functionally different from that of the Applicant's device as currently claimed.

Indeed, the optical element of Rudeen produces a light beam traveling along a single optical path which, in succession, is first deflected (when the scanning beam strikes upon the second end portion of the optical element). By contrast, the optical element of the Applicant's device produces at least two different light beams by splitting the collected light beam into two different light beam portions traveling simultaneously along different optical paths.

In other words, Rudeen's optical element just redirects or transmits undeflected the collected light beam depending upon which portion of the optical element the scanning beam strikes, but never splits the collected light beam into two different light beam portions which are transmitted simultaneously along different optical paths.

In addition thereto, Rudeen's reader needs more than one optical element to create the pair of cursor beams which forms a pair of visible light spots on the target object. Indeed, Rudeen needs both the dithering mirror which sweeps the light beam on the scanning plane and the optical element which generates the scanning line for reading the bar code and the pair of cursor beams forming the visible light spots on the target object. Off-axis movements and wear may occur because of the motion of the dithering mirror. Bu contrast, Applicant's invention as now claimed requires just one static optical element which does not suffer the above drawbacks.

In view of the above, Applicant's invention as currently claimed is novel and non-obvious over Rudeen.

Nor are the claimed features are not even anticipated or suggested by the other prior art applied in combination by the Examiner. Indeed, Reddersen discloses a scanning device and therefore the same considerations made with respect to Rudeen apply. Canini, which is discussed on page 3 of the specification as filed, discloses a device including a plurality of light sources, with each light source being adapted to illuminate, along a corresponding optical path, a corresponding end portion of the reading area. None of the above cited documents discloses a device having an optical element which splits the collected light beam into two different light beam portions which are transmitted simultaneously along different optical paths.

F. MISCELLANEOUS

In view of the foregoing and other considerations, the Examiner has ample bases for withdrawing all rejections and for allowance of all pending claims. Accordingly, a formal indication of allowance is earnestly solicited.

The Commissioner is authorized to charge the undersigned's deposit account #14-1140 in whatever amount is necessary for entry of these papers and the continued pendency of the captioned application.

Should the Examiner feel that an interview with the undersigned would facilitate allowance of this application, the Examiner is encouraged to contact the undersigned.

Respectfully submitted,
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

Claims 1, and 4 - 20 have been amended as follows:

1. {ONCE AMENDED} An aiming [A] device for aiming and visually indicating [the aiming and the visual indication of] a reading area of a coded information reader, comprising:

[-] means for emitting a light beam;

[-] means for [deflecting at least one first portion of] splitting the [said] light beam [so as to generate] into at least two different beam portions active on at least two different zones of a reading area of a coded information reader along at least two different optical paths;

wherein [characterised in that said] the means for [deflecting at least one portion of] splitting the [said] light beam consists of a refractive optical element.

4. {TWICE AMENDED} A device according to claim 1, wherein the [said] refractive optical element comprises first and second opposed faces [, respectively] for respectively collecting the light beam and projecting the [said] at least two beam portions on the [said] reading area, wherein an optical axis Z is defined into the [said] refractive optical element and the [said] second face comprises at least one first surface portion [of surface] inclined by a predetermined angle α with respect to the [said] first face and adapted to deflect the [said] at least one first portion of light beam by a predetermined deflection angle β with respect to the [said] optical axis Z.

5. {ONCE AMENDED} A device according to claim 4, wherein the [said] second face comprises two first surface portions, each [one] of the two first surface portions being inclined by a predetermined angle with respect to the first face and adapted to deflect a corresponding portion of the light beam by a predetermined deflection angle with respect to the optical axis Z.

6. {ONCE AMENDED} [A] An aiming device [according to claim 4,] for aiming and visually indicating a reading area of a coded information reader, comprising:

means for emitting a light beam;

means for splitting the light beam into at least two different beam portions active on at least two different zones of a reading area of a coded information reader along at least two different optical paths;

wherein the means for splitting the light beam consists of a refractive optical element;

wherein the refractive optical element comprises first and second opposed faces for respectively collecting the light beam and projecting the at least two beam portions on the reading area, wherein an optical axis Z is defined into the refractive optical element;

wherein said second face comprises four first surface portions, each of the four first surface portions being [one] inclined by a predetermined angle with respect to the first face and adapted to deflect a corresponding portion of the light beam by a predetermined deflection angle with respect to the [said] optical axis Z, so as to define, in the [said] refractive optical element, a poly-prismatic structure having a substantially pyramidal shape with a rhomboidal base.

7. {TWICE AMENDED} A device according to claim 1, wherein the [said] refractive optical element [also] comprises means for transmitting without any deflection [at least one] a second portion of the light beam towards the [said] reading area.

8.{ONCE AMENDED} A device according to claim 7, wherein the [said] means for transmitting without any deflection the [at least one] second portion of the light beam towards the [said] reading area is [are] provided centrally [,] in the [said] refractive optical element [, centrally with respect to said first inclined surface portions].

9.{TWICE AMENDED} A device according to claim 4 [7], wherein the refractive optical element comprises means for transmitting without any deflection a second portion of the light beam towards the reading area, and wherein the [said] second face comprises at least one second surface portion which is substantially flat and parallel to the [said] first face for collecting the light beam, the [said] at least one second surface portion forming the [said] means for transmitting without any deflection the [said] at least one second portion of light beam towards the [said] reading area.

10. {TWICE AMENDED} A device according to claim 4 [7], wherein the refractive optical element comprises means for transmitting without any deflection a second portion of the light beam towards the reading area, and wherein said refractive optical element comprises a through hole extended between the [said] first and second faces and

coaxially formed with respect to the [said] optical axis Z, the [said] through hole forming the [said] means for transmitting without any deflection the [said] at least one second portion of light beam towards the [said] reading area.

11.{TWICE AMENDED} A device according to claim 1, wherein the [said] refractive optical element has a cross section smaller than that of the [said] light beam.

12.{TWICE AMENDED} A device according to claim 4 [2], further comprising means for collimating the light beam, wherein the [said] collimation means comprises a collimation lens fixedly associated with the [said] refractive optical element at the [said] first face for collecting the light beam.

13. {ONCE AMENDED} [A] An aiming device [according to claim 4,] for aiming and visually indicating a reading area of a coded information reader, comprising:

means for emitting a light beam;

means for splitting the light beam into at least two different beam portions active on at least two different zones of a reading area of a coded information reader along at least two different optical paths;

wherein the means for splitting the light beam consists of a refractive optical element;

wherein the refractive optical element comprises first and second opposed faces for respectively collecting the light beam and projecting the at least two beam portions on the reading area, wherein an optical axis Z is defined into the refractive optical element;

wherein the [said] second face comprises at least one first peripheral surface portion inclined by a predetermined angle α_1 with respect to the [said] first face and adapted to deflect the [said] at least one first portion of light beam by a predetermined deflection angle β_1 with respect to the [said] optical axis Z, and at least one second [central] surface portion proximate a center of the second face, the at least one second surface portion being inclined by a predetermined angle α_2 different from α_1 , with respect to the [said] first face and adapted to deflect the [said] at least one portion of light beam by a predetermined deflection angle β_2 , different from β_1 , with respect to the [said] optical axis Z.

14.{ONCE AMENDED} A device according to claim 1, further comprising an amplitude mask adapted to impart a predetermined profile to the [said] at least two different beam portions.

15. {ONCE AMENDED} A device according to claim 14 [when dependent on claim 2], further comprising means for collimating the light beam wherein the [said] amplitude mask is arranged between the [said] collimation means and the [said] refractive optical element.

16.{ONCE AMENDED} A device according to claim 4, wherein the [said] at least one first inclined surface portion of the [said] refractive optical element is substantially planar [plane].

17.{ONCE AMENDED} A device according to claim 4, wherein the [said] at least one first inclined surface portion of the [said] refractive optical element is substantially cylindrical and convex.

18. {ONCE AMENDED} A device according to claim 17, comprising at least one diverging lens arranged upstream of the refractive optical element in correspondence to the [of said] at least one first inclined surface portion.

19.{TWICE AMENDED} An optical [Optical] element for [the] aiming and visually indicating [the visual indication of] a reading area of a coded information reader, comprising means for splitting [deflecting at least one first portion of a] light beam into [so as to generate] at least two beam portions adapted to be projected on at least two different zones of a reading area along at least two different optical paths, [characterised in that] wherein the [said] optical element is a refractive optical element.

20.{TWICE AMENDED} An optical [Optical] apparatus for reading information in a reading area, the optical apparatus comprising [characterised in that it comprises] an aiming device [according to claim 1], the aiming device having:

an emitter which emits a light beam;

an optical element [a light beam deflector] which splits [deflects at least one first portion of] the light beam into [so as to generate] at least two different beam portions active on at least two different zones of a reading area of the optical apparatus along at least two different optical paths, wherein the optical element consists of [light beam deflector comprising] a refractive optical element.